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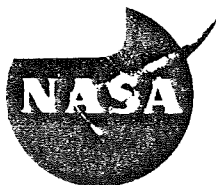
APOLLO PROGRAM OFFICE

CONFIGURATION MANAGEMENT OFFICE MANUAL

CONFIGURATION MANAGEMENT OFFICE (MAP-6)

FACILITY FORM 602

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CONFIGURATION MANAGEMENT OFFICE MANUAL

FOREWORD

This manual describes the established requirements and internal operations of the Apollo Program Office (APO) Configuration Management Office (CMO).

"Configuration" is defined as the complete technical description required to fabricate, test, accept, operate, maintain, and logistically support systems, equipments and components.

"Configuration Management" is the formal set of procedural concepts by which a uniform system of configuration definition (identification), change management (control), and configuration status reporting (accounting) is established and maintained for all systems, equipment and components.

Baseline definition or "configuration identification" is established through descriptive documentation, usually specifications and drawings. Change management or "configuration control" is accomplished through a review and approval/disapproval process accomplished by Configuration Control Boards (CCB) or their equivalent, established at various levels of program, project, system or contractor management. The tools of the review and approval/disapproval process are the Engineering Change package which describes and justifies the proposed (hardware) change, and is supported by items such as the Specification Change Notice (SCN) which changes a specification, the Interface Revision Notice (IRN) which changes an Interface Control Document, and the Configuration Control Board Directive (CCBD) which formalizes the decision of the CCB on the proposed change and authorizes and directs necessary action to effect the change when approved. Configuration status reporting, or configuration accounting is the reporting of the status of the baseline itself and documentation of changes made to systems and equipments subsequent to the establishment of the baseline configuration. The tools for this process are the Configuration Identification Index and the Configuration Status Accounting Report, which define actual configuration of systems and equipments at any point in time and the status of modifications. Document forms which are in support of, or equivalent to, the preceding vary with NASA Centers and their Contractors.

This manual is prepared, issued and maintained by the Apollo Program Office Configuration Management Office which has the responsibility and authority to assure implementation and operation of Configuration Management throughout all elements of the Apollo Program.

CONFIGURATION MANAGEMENT
OFFICE MANUAL

CONTENTS

Foreword	i
1.0 Introduction	1-1
1.1 Purpose	1-1
1.2 Scope	1-1
1.3 Organization	1-1
1.4 Reference Documentation	1-1
2.0 Apollo Program Office Configuration Management Objectives	2-1
2.1 Objectives	2-1
3.0 Authorities and Responsibilities	3-1
3.1 Basic authorities and responsibilities	3-1
3.2 Inter-relationships with other organizations	3-2
4.0 Operational Compliance	4-1
4.1 Responsibility	4-1
4.2 CMO Management (Working Group) Meetings	4-1
4.3 Attendance at Other Meetings	4-1
4.4 Review of Configuration Management Data	4-2
4.5 Audits	4-2
4.6 Deficiency Correction	4-2
5.0 Change Control	5-1
5.1 Control of changes required by NPC 500-1	5-1
5.2 Requirements and Procedures for Level I Change Processing	5-1

CONFIGURATION MANAGEMENT
OFFICE MANUAL

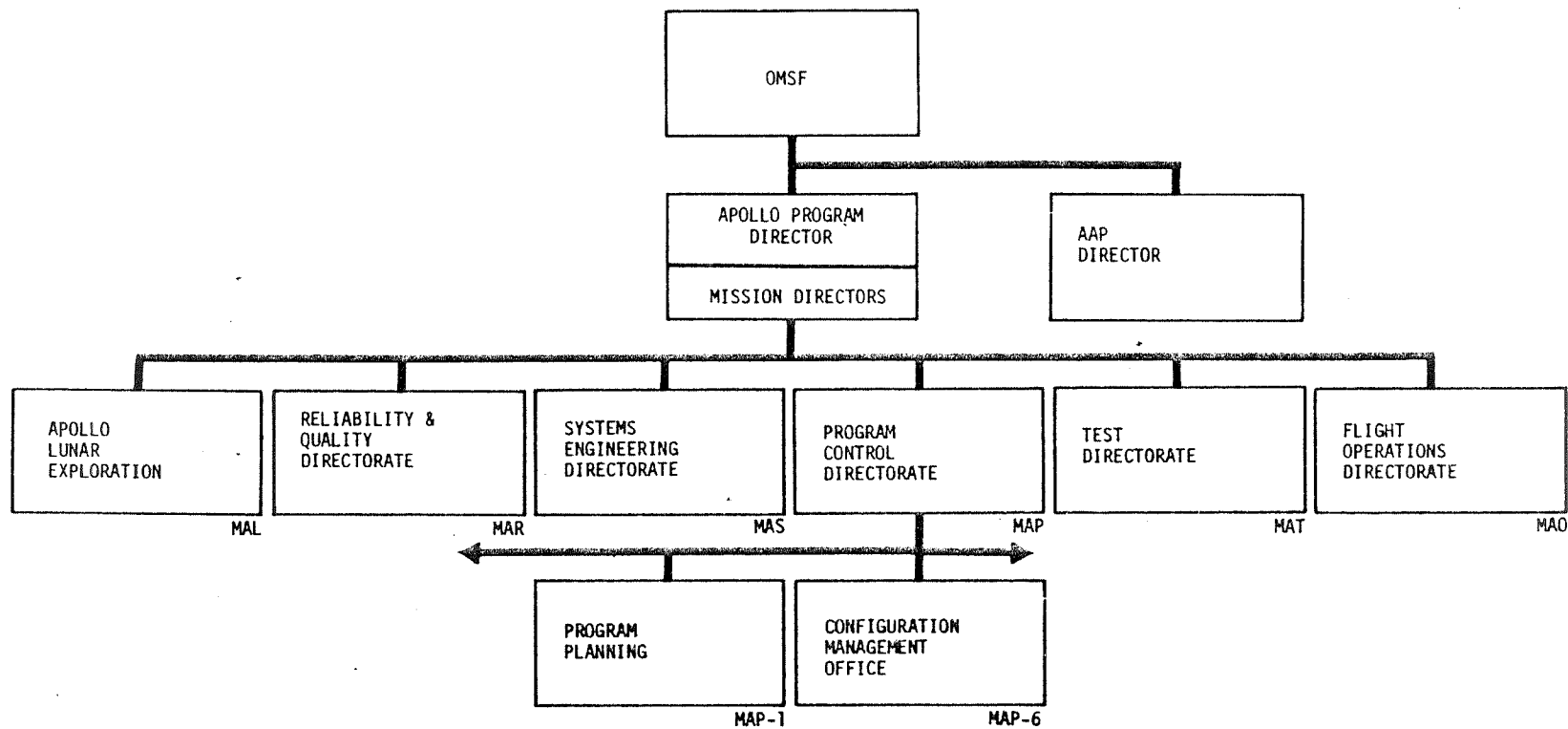
1.0 INTRODUCTION

- 1.1 Purpose - The purpose of this manual is to describe the established requirements and internal operations of the Apollo Program Office (APO) Configuration Management Office (CMO). These operations include relationships with the other APO and OMSF Directorates and offices, the Center Program Offices, the operations of the APO Configuration Control Board (CCB) (Level I) and the Inter-Center Interface Program. This manual is established as the sole authoritative source for these Configuration Management requirements and operations.
- 1.2 Scope - The provisions of this manual apply to the CMO, to those APO directorates and offices which provide inputs to and receive outputs from the CMO, to the methods of receiving Center provided inputs and to the distribution of Center applicable outputs. This manual is responsive to all directives and instructions issued by Apollo Program Director (MA) and the Director, Apollo Program Control Office (MAP).
- 1.3 Organization - The Apollo Configuration Management Office (CMO) is established within the Apollo Program Office, (See Figure 1), Apollo Program Control Directorate.
- 1.4 Reference Documentation - The latest issues of the following documents form a part of this procedure to the extent specified herein. This documentation is complementary and as such retains its individuality.

MA-001.00-1	Apollo Program Development Plan
NPC 500-1	Apollo Configuration Management Manual
NPC 200-0	Management of Government Quality Assurance Functions for Supplier Operations
NPC 200-1A	Quality Assurance Provisions for Government Agencies
NPC 200-2	Quality Program Provisions for Space System Contractors
NPC 250-2	Reliability Program Provisions for Space System Contractors
NHB 8080.1	Apollo Test Requirements
APD-4 Series	Apollo Program Schedule and Hardware Planning Guidelines and Requirements
APD-6B	Sequence and Flow of Hardware Development and Key Inspection, Review and Certification Checkpoints
APD-7	Apollo Design Certification Review
APD-8	Apollo Flight Readiness Reviews
APD-15	Status Reporting on FRR Part I Open Actions and Significant Open Actions Identified Subsequent to the FRR

CONFIGURATION MANAGEMENT
OFFICE MANUAL

APD-18	Changes to Apollo Hardware and Software for Saturn/Apollo Applications
APD-26B	Preparation of Test and Checkout Plans at KSC
APD-27	Procedures for Close-Out of Actions in Response to the AS-204 Accident Review Board Panel Findings
APD-29	Post-Accident Changes to Apollo Command and Service Module and Related Ground Facilities
APD-30A	Apollo Technical Integration and Evaluation (TIE) Communications and Working Relationships
APD-33	Center Responsibilities in the Apollo Program
APD-34	Apollo Program CCB Controls and Requirements
APD-36	Apollo Program Equipment Cannibalization Control
APD-42	Apollo Mission Implementation Plan
APD-44	Apollo Program Nonconformance Reporting and Corrective Action
APD-XX	Inter-Center Interface Management (to be issued)



APOLLO PROGRAM OFFICE ORGANIZATION CHART
WITH RESPECT TO THE
CONFIGURATION MANAGEMENT OFFICE (MAP-6)

FIGURE 1

CONFIGURATION MANAGEMENT
OFFICE MANUAL

2.0 APOLLO PROGRAM OFFICE CONFIGURATION MANAGEMENT OBJECTIVES

2.1 The Configuration Management Office objectives encompass the separate but mutually supporting efforts of Configuration Management and Interface Integration and Control, both of which are part of a total Configuration Management Program. These objectives are to:

2.1.1 Provide Apollo Program Management with visibility which will assure that:

2.1.1.1 Each space vehicle and its launch support is properly defined by documentation and that the "as-built" configuration reflects such documentation.

2.1.1.2 Inter-Center and Intra-Center interfaces are accurately and adequately defined.

2.1.2 Assure the adequacy of configuration management and change control throughout all levels of the Apollo Program (including Centers and Contractors.)

2.1.3 Establish and maintain viable working relationships with the Centers and others.

CONFIGURATION MANAGEMENT
OFFICE MANUAL

3.0 AUTHORITIES AND RESPONSIBILITIES

3.1 The basic authorities and responsibilities of the APO/CMO are derived from the Apollo Program Development Plan (MA 001.00-1), applicable Apollo Program Directives (APD), and internal instructions (e.g., APOI's) to provide the over-all management direction necessary to conduct Configuration Management throughout the Apollo Program.

3.1.1 Specific Responsibilities: Meet configuration management objectives (paragraph 2.0) through appropriate procedures, utilizing already established information channels, documentation and data reporting systems as follows:

- 3.1.1.1 Establish and operate the Apollo Program Configuration Management Office (APO/CMO).
- 3.1.1.2 Provide administrative support and secretariat services for the Apollo Program Directors Configuration Control Board (Level I CCB).
- 3.1.1.3 Review and insure that all configuration management requirements are validated and incorporated in procurement plans, development plans and contracts.
- 3.1.1.4 Provide active guidance and management support to MSC, MSFC and KSC in the operation of their configuration management programs.
- 3.1.1.5 Provide APO visibility of significant Configuration Management activities such as analysis of change, status and trends, and configuration differences.
- 3.1.1.6 Participate in key inspection reviews and inspections.
- 3.1.1.7 Direct the Inter-Center Interface Coordination Panel program including the Inter-Center ICD Repository operation. Evaluate and assure the adequacy of program interface management and documentation.
- 3.1.1.8 Establish and direct the Configuration Management Working Group consisting of Configuration Management representatives from APO/CMO and each Center to coordinate configuration management activities.

CONFIGURATION MANAGEMENT
OFFICE MANUAL

- 3.1.1.9 Maintain the Apollo Configuration Management Manual, NPC 500-1 and update as required. Originate and maintain applicable Apollo Program Directives and other documentation.
 - 3.1.1.10 Represent the Apollo Program office at symposia and meetings with industrial and government organizations to effect coordination of configuration management activities and to develop technical standards applicable to the Apollo Program.
 - 3.1.1.11 Direct and monitor Contractor Technical Integration and Evaluation Tasks related to Configuration Management under Contract NASw-1650.
- 3.2 Inter-Relationships with other organizations
- 3.2.1 Mutual relationship and support is required between the CMO and other organizational elements of the Apollo Program Office. Following are the prime CMO activities as related to other APO elements.
 - 3.2.1.1 Other Program Control Directorate (MAP) Offices
 - 3.2.1.1.1 Program Planning - Mutually exchange information relative to change status, mod-kit installations, costs and schedule impacts. Provide Level I CCB support for Control milestone and hardware quantity changes in accordance with APD-4. Provide support in Congressional matters such as the AS-204 accident review action item status. Coordinate program cost and schedule impact evaluation as required for Level I CCB support (see "Change Control" paragraph 5).
 - 3.2.1.1.2 Procurement and Resources - Review contracts to assure that Configuration Management requirements are contractually adequate. Support contract negotiations and contract change authorizations (CCA's). Provide data as required.
 - 3.2.1.1.3 Apollo Action Center - Provide significant Configuration Management data in chart form to give Program Management visual status.

CONFIGURATION MANAGEMENT
OFFICE MANUAL

- 3.2.1.1.4 Program Integration and Reports -
Furnish Configuration Management data
as required to meet Program Integration
and Reporting requirements.
- 3.2.1.1.5 Logistics Support - Provide configuration
data and changes thereto to allow logis-
tics consideration of such items as pro-
duction effectivity, retrofit, cost and
delivery of retrofit kits and special
tools, effect on logistic support and
support materials, etc. Assure logistics
impact evaluation of all proposed changes
as required for Level I CCB support (see
"Change Control" paragraph 5).

3.2.1.2 Test (MAT)

- 3.2.1.2.1 Provide configuration data and changes
thereto so that test may provide veri-
fication that the hardware tests (quali-
fied) is the same configuration as the
hardware to be flown. Support Test pro-
gram requirements which are affected by
configuration changes.

3.2.1.3 Quality and Reliability Assurance (MAR)

- 3.2.1.3.1 Quality and Reliability Assurance (Q & RA)
inspects and accepts a manufactured
article by comparing the article with
the approved configuration (drawings and
specifications) which define it. The con-
figuration must be identified (see "Apollo
Specification Program" paragraph 7),
changes controlled (see "Change Control"
paragraph 5 and "Interface Management"
paragraph 6) and its identity accounted
for (see "Reporting/Data Requirements" para-
graph 8), to assure that hardware or soft-
ware is accepted only when compatible with
requirements.
- 3.2.1.3.2 Q & RA responsibilities with respect to
Configuration verification are defined in
NPC 200, NPC 200-1A, NPC 200-2, and NPC 250-
1. The APO/CMO and MAR mutually support each
other to assure documentation and implementation
compatibility exist.

CONFIGURATION MANAGEMENT
OFFICE MANUAL

3.2.1.4 Flight Operations (MAO)

- 3.2.1.4.1 Provide Configuration Management data and changes thereto so that their effect on Mission requirements, rules, operations, and procedures may be evaluated. Identify and support MAO in the control of hardware/software interfaces with MSFN, DOD and Crew Training Operations.

3.2.1.5 Systems Engineering (MAS)

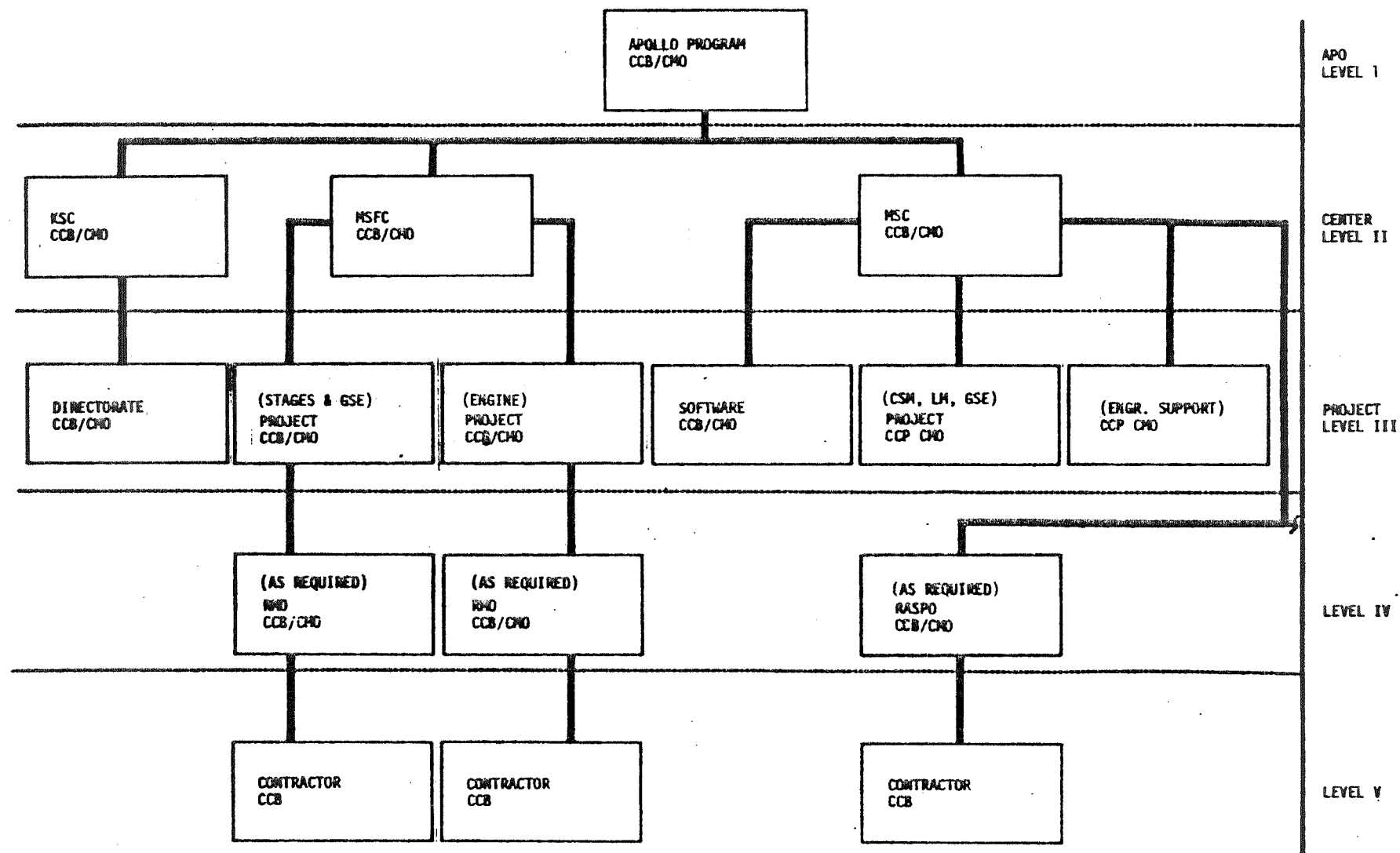
- 3.2.1.5.1 Support MAS in the maintenance of the Apollo Program specification as processed through the Level I CCB.
- 3.2.1.5.2 Mutually exchange configuration and change data in support of and resulting from technical and engineering studies.
- 3.2.1.5.3 Coordinate system engineering reviews conducted to define technical interfaces, interface requirements and recommended changes to Interface Control documentation.
- 3.2.1.5.4 Provide to MAS weight and performance data generated within the configuration management program.

3.2.1.6 Apollo Lunar Exploration (MAL)

- 3.2.1.6.1 Mutually exchange configuration management data dealing with experiment assignments and changes thereto.
- 3.2.1.6.2 Coordinate system engineering reviews dealing with experiment assignments conducted to define technical interfaces, interface requirements and recommended changes to Interface Control documentation.

3.2.1.7 Centers

- 3.2.1.7.1 Coordination and management support in all the areas defined in paragraph 3 is required to assure the effective implementation and operation of Apollo Configuration Management at all levels of the Program (see Figure 2).



APOLO PROGRAM CCB & CCP/CMO RELATIONSHIPS

FIGURE 2

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OFFICE MANUAL

3.2.1.8 Apollo Applications Program

3.2.1.8.1 The APO/CMO shall satisfy the Apollo Configuration Management requirements with respect to Apollo hardware modified for AAP in accordance with APD-18.

3.2.1.8.2 Assure that continuity and compatibility is retained in the area of configuration management and that an orderly transfer of data and procedures occurs.

3.2.1.9 Apollo Applications Program

3.2.1.9.1 The APO/CMO shall satisfy the Apollo Configuration Management requirements with respect to Apollo hardware modified for AAP in accordance with APD-18.

3.2.1.9.2 Assure that continuity and compatability is retained in the area of configuration management and that an orderly transfer of data and procedures occurs.

CONFIGURATION MANAGEMENT
OFFICE MANUAL

4.0 OPERATIONAL COMPLIANCE

- 4.1 The APO-CMO has the responsibility for overall Apollo Configuration Management operating methods and procedures. Center Management is primarily responsible for compliance with APO policies and procedures. The APO/CMO is to assure said compliance by one or more of the following:
 - 4.1.1 Periodic management (see working group, paragraph 3.1.1.8) meetings between the Apollo and all Center level Configuration Management Offices.
 - 4.1.2 Monitor and/or participate in Center conducted Configuration Management reviews, inspections, audits, etc.
 - 4.1.3 Assessment of Center-generated Configuration Management data which is submitted to APO.
 - 4.1.4 Audit of Center/Project/Contractor Configuration Management practices.
 - 4.1.5 Implementation of corrective actions which deficiencies exist.
- 4.2 CMO Management (Working Group) Meetings
 - 4.2.1 The Chief of the APO/CMO shall be responsible for the scheduling and conduct of periodic management (working group) meetings between the APO/CMO and all Center CMO's. This shall include discussions of items in areas such as:
 - 4.2.1.1 Mutual agreement on the translation of APO/CMO/Center philosophy and requirements and their translation into effective implementation at all levels.
 - 4.2.1.2 Discussion of problems and their resolution.
 - 4.2.1.3 Other mutual interest subjects.
- 4.3 Attendance at Other Meetings
 - 4.3.1 The APO/CMO will monitor and/or participate in applicable Center-conducted design reviews, inspections, audits, etc. to assure that Configuration Management requirements are being effectively met.

CONFIGURATION MANAGEMENT
OFFICE MANUAL

4.4 Review of Configuration Management Data

4.4.1 The APO/CMO will review Center prepared Configuration Management data submitted to the APO. This data shall include but not be limited to:

4.4.1.1 Data required by APD-34.

4.4.1.2 Minutes of Design Reviews and inspections.

4.4.1.3 Interface Control Documentation Log and periodic Interface Status Reports.

4.4.1.4 Specification Indices.

4.4.1.5 Level A ICD's and IRN's

4.4.1.6 Configuration Management requirements, procedures, plans and manuals.

4.5 Audits

4.5.1 Configuration Management audits of the Center systems which implement APO requirements will be conducted by APO/CMO at Center/Project/Contractor level to ensure that management compatibility exists between the requirements and their implementation. Audit procedures are defined in Attachment 2.

4.6 Deficiency Correction

4.6.1 Analyse deficiencies, inform Centers thereof and implement necessary corrections.

CONFIGURATION MANAGEMENT
OFFICE MANUAL

5.0 CHANGE CONTROL

5.1 The control of changes required by the Apollo Configuration Management Manual NPC 500-1, established that all departures from contracted baselines will be processed to meet the intent of ANA Bulletin 445, Air Force-Navy Aeronautical Bulletin, Engineering Changes to Weapons, Systems, Equipment and Facilities.

5.1.1 The Apollo CCB (Level I) has been established by the Apollo Program Director with decision-making authority for changes requiring Program Director approval. The directions of the Apollo CCB (Level I) will be transmitted to the Center Program Manager by a Configuration Control Board Directive (CCBD).

5.1.2 Apollo Program Director approval is required for Level I changes which meet one or more of the criteria defined in NPC 500-1 as modified by Apollo Program Directive 34.

NOTE: The Mission Director is delegated certain change approval authority during periods of prelaunch preparation at KSC. (See latest issue of Apollo Program Directive 34).

5.2 Requirements and Procedures for Level I Change Processing are contained in Attachment 3.

CONFIGURATION MANAGEMENT
OFFICE MANUAL

6.0 INTERFACE MANAGEMENT

6.1 The Configuration Management Office in the administration of the Inter-Center Interface Program shall:

6.1.1 Provide the Chairman of the Inter-Center Interface Executive Secretariat and perform the administrative functions for the secretariat.

6.1.2 Monitor the activities of the Inter-Center Panels and act as the focal point for transmittal of required actions thru the Level I CCB.

6.1.3 Administer the Inter-Center Interface Control Program for the Apollo Program Office CCB.

6.1.4 Monitor the activities of the Inter-Center Interface Control Documentation Repository at MSFC

6.2 Inter-Center Interface Management Requirements and Procedures are detailed in APD XX (to be issued).

CONFIGURATION MANAGEMENT
OFFICE MANUAL

7.0 APOLLO SPECIFICATION PROGRAM

7.1 The Configuration Management Office in support of the Apollo Specification Program shall:

- 7.1.1 Provide Configuration Management criteria for use in preparation and maintenance of the Apollo Program Specification.
- 7.1.2 Assure that Centers prepare and maintain a Specification Index.
- 7.1.3 Audit Program, Project, System CEI and critical component specifications for conformance with Apollo Program specification requirements with respect to Configuration Management requirements.
- 7.1.4 Assure that all required specifications have been defined, implemented and are maintained in accordance with NPC 500-1 requirements.
- 7.1.5 Process changes (SCN's) to the Apollo Program Specification in accordance with change control procedures established herein and NPC 500-1 requirements.

7.2 The Apollo Program Level I CCB shall:

- 7.2.1 Process changes (SCN's) and revisions to the Apollo Program Specification in accordance with Attachment 3 (Change Processing).

CONFIGURATION MANAGEMENT
OFFICE MANUAL

8.0 REPORTING/DATA REQUIREMENTS

8.1 The Apollo Configuration Management Office acquires APO/Center produced data, indices and reports, and edits and compiles selected data into Configuration Management reports and data which provide Apollo Program and Center management with visibility and with recommendations for problem resolution. This covers the following general areas.

8.1.1 The Inter-Center Interface Program

8.1.2 Center Change Activity

8.1.3 Level I CCB Activity

8.1.4 Configuration Differences

8.1.5 Policies and Procedures

CONFIGURATION MANAGEMENT
OFFICE MANUAL

ATTACHMENT I
NOMENCLATURE

CONFIGURATION MANAGEMENT
OFFICE MANUAL

NOMENCLATURE

AAP	Apollo Applications Program
APD	Apollo Program Directive
APO	Apollo Program Office
CARR	Customer Acceptance Readiness Review
CCB	Configuration Control Board
CCBD	Configuration Control Board Directive
CCP	Configuration Control Panel
CDR	Critical Design Review
CEI	Contract End Item
CMO	Configuration Management Office
ECP	Engineering Change Proposal
EO	Engineering Order
FACI	First Article Configuration Inspection
ICD	Interface Control Document
IRN	Interface Revision Notice
KSC	Kennedy Space Center
MSC	Manned Spacecraft Center
MSFC	Marshall Space Flight Center
MSFEB	Manned Space Flights Experiments Board
OMSF	Office of Manned Space Flight
PDP	Program Development Plan
PDR	Preliminary Design Review
RASPO	Resident Apollo Spacecraft Project Office (MSC)
RMO	Resident Management Office (MSFC)
SARP	Scheduling & Review Program Procedures
SCN	Specification Change Notice
TIE	Technical Integration and Evaluation

CONFIGURATION MANAGEMENT
OFFICE MANUAL

ATTACHMENT II

CONDUCT
OF
CONFIGURATION MANAGEMENT AUDITS

CONFIGURATION MANAGEMENT
OFFICE MANUAL

REQUIREMENTS AND PROCEDURES
FOR
CONDUCT OF AUDITS

1. Conduct of Audits

- 1.1 The Chief of the APO CMO is responsible for preparation and conduct of all APO conducted Configuration Management Audits and shall:
 - 1.1.1 Act as audit Chairman
 - 1.1.2 Schedule audits on both a periodic and a need basis if a known problem area exists.
 - 1.1.3 Advise Centers of the proposed audit and general subjects in writing at least 10 days prior to the proposed data. This shall include requests for such support, facilities etc. as may be required.
 - 1.1.4 Request such support as necessary from other APO directorates in specialized areas.
 - 1.1.5 Conduct a pre-audit conference at which team members will meet with Center personnel at the Center facility. The audit team chairman will detail the objectives and general plan of the evaluation for the understanding of all concerned.
 - 1.1.6 Conduct the audit and evaluate the configuration management program utilizing the procedures and checklists outlined herein.
 - 1.1.7 Conduct a daily meeting of all participating parties, or individuals, as the chairman sees fit, at the end of each day to review the day's activities, adjust schedules as needed, and to coordinate the following day's activities.
 - 1.1.8 Consolidate daily results in preparation for exit critique.

CONFIGURATION MANAGEMENT
OFFICE MANUAL

- 1.1.9 Conduct exit critique with Center personnel, and discuss the preliminary results of the evaluation. The Center personnel should be given an opportunity to explain any unusual or discrepant information obtained. This critique will normally be held the day following completion of the audit and will continue until the team chairman signifies adjournment.

2. Pre-Audit Team Actions

- 2.1 The Chief of the APO CMO acts as chairman of the audit team. The team chairman will initiate requests to other concerned internal organizations for representation on the audit team. Team members are assigned primary responsibility for conduct of the audit.
- 2.2 In addition to team members, other interested personnel shall be notified as directed by the Team Chairman. All personnel having an interest in or possessing pertinent knowledge of the audit subject should be invited to attend a preliminary meeting. At this preliminary meeting, the following activities shall be performed:
 - 2.2.1 Discussion of the purpose, needs and causes that initiated the audit action.
 - 2.2.2 Establish a breakdown of audit elements and assignment of individual responsibilities to the team members by the chairman.
 - 2.2.3 Evaluate the scope of the audit, manhours available, and establish time schedules for performance of pre-audit actions and the audit itself.
 - 2.2.4 An individual review shall be performed by each team member of background data and information concerning his assigned element(s) of responsibility. This review shall include the compilation of specific information and audit plan details to be used in the performance of the audit.

CONFIGURATION MANAGEMENT
OFFICE MANUAL

2.2.5 A pre-audit meeting of the team members shall be called by the chairman after completion of the individual reviews and prior to "audit notification." At this meeting, plans will be finalized concerning the pending audit. All pertinent data which may significantly affect schedule, elements of the audit facilities, personnel, etc., shall be presented at this meeting for discussion and resolution or decision.

3. Audit Records and Reports

3.1 Each team member shall be responsible for providing and maintaining accurate records of conditions found within his assigned area which shall be reported in the following format:

3.1.1 Finding: A statement of the fact(s) identifying particular problem area without embellishment.

3.1.2 Determination: Based upon data available, an analysis is made and conclusions are drawn.

3.1.3 Recommendation(s): Corrective action(s) required at the center or its field operation.

3.2 A preliminary report which summarizes findings shall be presented to the team chairman by each team member prior to the exit critique. This report shall contain an accurate description of individual non-conformances in sufficient detail as to provide conclusive evidence of the existing situation. These preliminary reports shall be the basis for discussion during the exit critique.

3.3 Maintenance of minutes will be the responsibility of the audit team chairman. This responsibility encompasses all official gatherings of audit personnel, and specifically, the preliminary meeting, pre-audit meeting, pre-audit conference, daily audit meetings, and exit critique.

3.4 A final audit report shall be prepared by the team under the direction of the chairman and published as soon as practical after the conclusion of the audit. The report shall be a consolidation of the preliminary reports submitted by the team members and a summarization of minutes

CONFIGURATION MANAGEMENT
OFFICE MANUAL

of meetings. The report will contain a complete description of audit actions using the following elements as an organizational guide:

- i. Contents
- 11. Summary

I. General

- a. Audit Title
- b. Participants
- c. Audit Subject
- d. Audit Site
- e. Inclusive dates of audit
- f. Participating Personnel

II. Introduction

- a. Reasons for audit
- b. Objectives and scope
- c. Background Information

III. Planning

- a. Selection of Team
- b. Preliminary Meeting

IV. Performance

- a. Areas of Investigation
- b. Preliminary Meeting

V. Conclusions

- a. Items recorded for information only
- b. Action Items reported
 - 1. Items corrected during audit
 - 2. Items for which formal corrective action is (has been) requested
- c. Corrective action responsibilities and assignments

- 3.4.1 The audit team chairman will transmit copies of all final audit reports to appropriate Center, Apollo Program Director and appropriate APO and OMSF personnel.

4. Audit Survey Checklist

- 4.1 This checklist is intended to be representative and may be expanded or contracted as necessary in the judgement of the Team Chairman. Centers will be notified accordingly if such occurs.

4.1.1 Organization

- a. Is there a current organization chart?

CONFIGURATION MANAGEMENT
OFFICE MANUAL

- b. Where in the organization is the configuration management office established?
- c. How many civil service personnel are in the CMO?
- d. How much contractor support is provided to the CMO?
- e. Are there organization charts of the CMO?
- f. Are there current writeups of the individual job responsibilities?
- g. How do these writeups compare with the actual job responsibilities?
- h. Is there a flow chart showing the implementation of approved engineering changes?
- i. Is there a flow chart showing the approval and implementation of engineering changes?
- j. Does Configuration Management have the adequate support of top management?
- k. Are there existing policies and/or procedures for implementing configuration management?
- l. Is interface control a part of the configuration management function?

4.1.2 Training

- a. Is there a configuration management training course?
- b. What personnel take the course?
- c. Have all engineering management personnel taken the course?
- d. How often is the course given?
- e. What written material is utilized in giving the course?

4.1.3 Configuration Management Office Functions

- a. Do Configuration Management Plans, Manuals, Procedures, Flow Charts, Requirements, Documents, etc. exist and are they implemented and followed?
- b. Do files contain all specifications?
- c. Are specifications adequate?
- d. Are specifications up-to-date?
- e. Do change (ECP) files contain all applicable change paper?
- f. Are meaningful agendas and minutes published for CCB meetings?
- g. Are changes pre-coordinated with other CCB/CMO when interface is affected?

CONFIGURATION MANAGEMENT
OFFICE MANUAL

- h. Are CCBD's accurate, concise and do they have proper descriptions of required actions when appropriate?
- i. Does an adequate Configuration Identification and Accounting Index exist?
- j. Does a change tracking system exist which follows a change from initiation to incorporation?
- k. Does the affected Contracts office implement CCBD's as directed thereby?
- l. Are Class II changes monitored?
- m. Does Quality Assurance monitor configuration?
- n. Are "process specs" controlled where necessary (Approval and changes by CCB action)?
- o. Are formal ECP's submitted for waivers and deviations?
- p. Are ECP's adequate, descriptive and timely?
- q. Does the CMO participate in Design Reviews and Inspections? To what extent?
- r. Are specifications and all SCN's/ECP's approved by CCBD's?
- s. Are adequate Acceptance Data Packages required and maintained at all sites and Centers?
- t. Are field "make-work" changes fed-back to all required areas? Are affected drawings updated and subsequent effectivities covered by ECP's?
- u. Are MRB actions monitored to ensure Configuration changes do not occur by MRB actions?
- v. Do like solutions (Part II specs) exist for all requirements for subsequent effectivities unless changed by approved ECP after the specification is baselined? Does contractor's release system stop EO release by closing out internal authorizing paper (such as MCR's) unless an ECP is approved?

4.1.4 Configuration Control Board

- a. To whom does the CCB chairman report?
- b. Are all affected organizations represented and do they regularly attend meetings?
- c. Is approval authority delegated by the CCB Chairman? To whom and to what extent?
- d. Does the CCB meet on a regularly scheduled basis?
- e. Are CCBD's signed at meetings?
- f. Does the CCB approve "Product Improvement" changes which do not have significant cost or performance gains?

CONFIGURATION MANAGEMENT
OFFICE MANAGEMENT

4.1.5 Design Reviews and Inspections

- a. Do plans exist for conduct of PDR, CDR and FACI?
- b. Are reviews scheduled?
- c. Are minutes kept which are descriptive of the conduct?
- d. Are specifications baselined (approved) by CCBD's at appropriate points?
- e. Are CCBD's contractually implemented?
- f. Do Part I Requirements and Part II Design Definition changes require ECP's to be submitted (formal change control implemented) after approval?
- g. At FACI
 - 1. Was the Release system checked for adequacy?
 - 2. Was the part number system checked?
 - 3. Were all approved ECP's checked for incorporation?
 - 4. Was manufacturing documentation checked to ensure incorporation of latest engineering drawing changes?
 - 5. Did actual hardware configuration agree with the released engineering drawings?
 - 6. Did follow-up occur which closed out open Configuration Management action items?

4.1.6 Hardware/Software Modifications

- a. Is there a tracking system for approved modifications?
- b. How are these modifications picked up?
- c. How are these modifications closed out?
- d. When are these modifications closed out?
- e. Can the number of open modifications be determined at any time?
- f. Is there a means of determining the modification which will delay a launch or delivery by late completion?

CONFIGURATION MANAGEMENT
OFFICE MANUAL

ATTACHMENT III

PROCESSING OF CHANGES
REQUIRING
LEVEL I CCB (APOLLO PROGRAM DIRECTOR)
APPROVAL

CONFIGURATION MANAGEMENT
OFFICE MANUAL

REQUIREMENTS AND PROCEDURES
FOR
PROCESSING CHANGES REQUIRING
LEVEL I CCB APPROVAL

1. Processing of Changes requiring Level I CCB Approval
 - 1.1 Approval is required by the Apollo Program Director's CCB (Level I) for those engineering changes which meet one or more of the criteria defined in NPC 500-1 and elaborated on by Apollo Program Directive #34.
 - 1.2 Responsibility for approving engineering changes during pre-launch periods at KSC is delegated to the Mission Director by Apollo Program Directive #34.
 - 1.3 The Apollo Program Office CCB is supported by the Configuration Management Office in the processing of Level I changes.
2. Organizational Requirements -
 - 2.1 The operation of Configuration Management within the Apollo Program Office requires the integrated functioning of the Level I Configuration Control Board (APO CCB) and the Configuration Management Office (APO CMO).
 - 2.1.1 Apollo Program Office Configuration Management Office (CMO)

The CMO provides the administrative support to the CCB and Directorates in the performance of Configuration Management. The major responsibilities of the CMO are set forth in NPC 500-1. Within the Apollo Program Office, the CMO shall be the focal point for receipt of all proposed changes. The CMO provides the CCB Secretary and shall:

 - 2.1.1.1 Receive, log and publish weekly the status of all Level I changes.
 - 2.1.1.2 Review changes from an administrative standpoint.
 - 2.1.1.3 Assure that copies of changes are reproduced and expeditiously distributed to the CCB Chairman, and members.
 - 2.1.1.4 Issue notices of CCB meetings and agendas therefor as called by the CCB Chairman. Maintain an Agenda Item Number Log and file of record for all changes.

CONFIGURATION MANAGEMENT
OFFICE MANUAL

- 2.1.1.5 Prepare and process Configuration Control Board Directives (CCBDs) for action.
- 2.1.1.6 Assign ECP and SCN numbers for changes originating within the Apollo Program Office.
- 2.1.1.7 Arrange for presentation of all changes to the CCB
- 2.1.1.8 Record the official minutes of the meeting and within five days thereafter issue the minutes.
- 2.1.1.9 Distribute the CCBD and necessary change documentation to the affected Centers for implementation with copies to all Center Directors, affected Program Managers and APO Directors.
- 2.1.1.10 Enter the disposition of the change in the Log and maintain the entire change package in the master file of record.

3. Procedures

- 3.1 Proposed changes, to be reviewed and approved by the CCB, originate from the Centers or from within the Apollo Program Office. The procedures for each case are discussed separately below.

- 3.1.1 Proposed Changes Submitted by the Centers (See Figure 3)

- 3.1.1.1 Changes requiring APO CCB approval as defined in NPC 500-1 and amended by Apollo Program Directives are submitted by the Center Program Manager to the Apollo Program Office (APO) CMO for action. The CCB Secretary shall perform an administrative review of the change documentation to assure that all forms, attachments, numbering, etc., are complete to permit satisfactory review. The Secretary shall enter the ECP and SCN numbers and the date of receipt on the APO CCB Agenda Item Number Log and shall assign an Agenda Item Number as the control number for logging all ensuing actions for a particular change package.

CONFIGURATION MANAGEMENT
OFFICE MANUAL

- 3.1.1.2 Upon completion of the administrative review, the CCB Secretary shall distribute an information copy of the change to the Chairman and copies to each of the CCB members for evaluation and comment. The secretary shall establish the date and agenda for the CCB meeting and shall issue the notice of meeting and agenda to the members as early as practicable. Routine ECP's will be scheduled for a maximum of 8 working days of review. Emergency ECP's will be scheduled for immediate action. The originating Center shall be responsible for classifying an ECP as emergency or routine.
- 3.1.1.3 The CCB members evaluate each change to establish impact in their area. In the event a member plans non-concurrence with a proposed change, he shall also furnish the CCB Secretary a written statement of his position.
- 3.1.1.4 Upon receipt of a members' non-concurrence statement the CCB Secretary shall make the members position known to the CCB Chairman prior to the meeting. In this capacity, the CCB Secretary acts only as the coordination agency in obtaining comments; and shall not undertake to resolve disagreements that may exist between members. A pre-CCB meeting may be held to resolve disagreements if desired by the Chairman.
- 3.1.1.5 The Chairman will convene the CCB to consider the change proposals and determine the course of action to be taken.
- 3.1.1.6 Each change proposal will normally be reviewed in agenda order, and one of the following courses of action will be taken:
 - 3.1.1.6.1 The ECP may be approved as written and CCBD issued.
 - 3.1.1.6.2 The ECP may be disapproved. The reasons shall be clearly stated on the CCBD.
 - 3.1.1.6.3 The ECP may be approved with specified changes. The changes are to be clearly stated on the CCBD.

CONFIGURATION MANAGEMENT
OFFICE MANUAL

- 3.1.1.6.4 Final resolution may be deferred for further investigation. Responsibility (with a due date) will be assigned to a specific member.

NOTE: CCB action will not be considered final until the CCBD is signed by the Chairman.

- 3.1.1.7 Members will state their position on each proposed change. In the event a member non-concurs with the CCB Chairman's decision on a change, he may prepare a CCBD Data Amplification Sheet (DAS) with reasons for the non-concurrence and transmit the DAS to the CCB Secretary within one working day after the meeting at which the member non-concurred. CCBD Data Amplification Sheets explaining the reasons for non-concurrence will be made a part of the official file.

3.2.2 Proposed Changes Originating within the Apollo Program Office (See Figure 4)

The procedures to be followed under this condition are basically the same as those set forth in paragraph 3.1.1, above with the exception that proposed changes, as required, may be coordinated with the Center Program Managers prior to submittal to the Apollo Program Office CCB.

- 3.2.2.1 Changes may originate within any Directorate of the Apollo Program Office. The originator, as required, may perform preliminary coordination of the change with the Center Program Manager. The originator shall then prepare the necessary documents such as a Specification Change Notice; the Engineering Change Proposal per NPC 500-1 with support from the CCB Secretary of the CMO. An ECP and SCN number shall be obtained from the CCB Secretary and the documents shall be submitted to the CCB Secretary through the originator's CCB member.
- 3.2.2.2 The CCB Secretary shall enter the ECP in the Log, perform the administrative review, issue notice of meeting and agenda, retain the original of the change documentation and distribute copies as follows:

CONFIGURATION MANAGEMENT
OFFICE MANUAL

3.2.2.2.1 CCB Chairman for information

3.2.2.2.2 CCB members for evaluation and comment

3.2.2.2.3 Center Program Managers (via Center CMO) for evaluation and comment (as required).

3.2.2.3 The remaining procedures are identical to paragraph 3.1.1.3 and on.

3.3 Change Requiring Center ECP/SCN Submittal (See Figure 5).

The procedures to be followed for these changes are basically a combination of paragraphs 3.1.1 and 3.2.2 wherein the request for a Center submittal of an ECP/SCN is originated in the Apollo Program Office and is processed via the Apollo Program Office CCB with a resultant CCBD to the appropriate Center requesting the ECP/SCN submittal. From this point the procedures of paragraph 3.1.1 is followed. The proposed ECP/SCN shall be coordinated with other affected Center Program Managers prior to submittal to the Apollo Program Office CCB.

3.4 Control Milestone and Hardware Quantities Change Requests

These changes affect the schedule requirements of the Apollo Program. By definition in NPC 500-1 and APD 34 the changes are therefore subject to Level I CCB decision.

3.4.1 Change requests to Apollo Control Milestones and Hardware Quantities, as defined in Apollo Program Directive No. 4 (of current issue) and Apollo Program Directive No. 34, are received from the Centers as follows:

3.4.1.1 Normal Cycle - Change requests will be submitted via the monthly Scheduling and Review Procedures (SARP) submission.

3.4.1.2 Expedited Cycle - Change requests will be submitted via telegram or letter to the Apollo Program Director with a copy to the Apollo Program Control Director.

CONFIGURATION MANAGEMENT
OFFICE MANUAL

3.4.2 For the normal cycle the change request is handled as a proposed change originating within the Apollo Program Office in accordance with the procedures of 3.1.1 with MAP-1 as the acting originator. The Apollo Program Director's decision arrived at in the meeting of his CCB will be transmitted to the Centers by the SCHEDULE Exception and Operations directive rather than by CCB.

3.4.3 For the Expedited Cycle the procedure is the same as the Normal Cycle except the requests will be returned, with decision, to the Program Manager by means of the TWX in accordance with the procedures of Apollo Program Directive No. 4 (of current issue).

3.5 Experiment Assignments to Apollo Missions

The procedures of paragraph 3.2.2 shall be used for approval of assignment of Manned Space Flight Experiments Board (MSFEB) approved experiments to Apollo Missions. The originator will normally be Director, Apollo Lunar Explorations Office.

3.6 Changes to Apollo Hardware and Software for Apollo Applications Program

Changes proposed to Apollo hardware and software to meet authorized requirements of the Apollo Applications Program as defined in Apollo Program Directive No. 18 are processed as prescribed in that Directive. All such changes will be forwarded to Apollo Applications Program Level I CCB for approval prior to Apollo Level I CCB action. The change requests, when originated at the Center(s), follow the procedure of paragraph 3.1.1. When the change request originates from within the Apollo Program Office, the procedure of paragraph 3.2.2 is followed.

4. Support to Mission Director

4.1 During the period described in and in accordance with the applicable provisions of APD 34, the Configuration Management Office will support the operation of the Level I CCB while its functions are delegated to the Mission Director as follows:

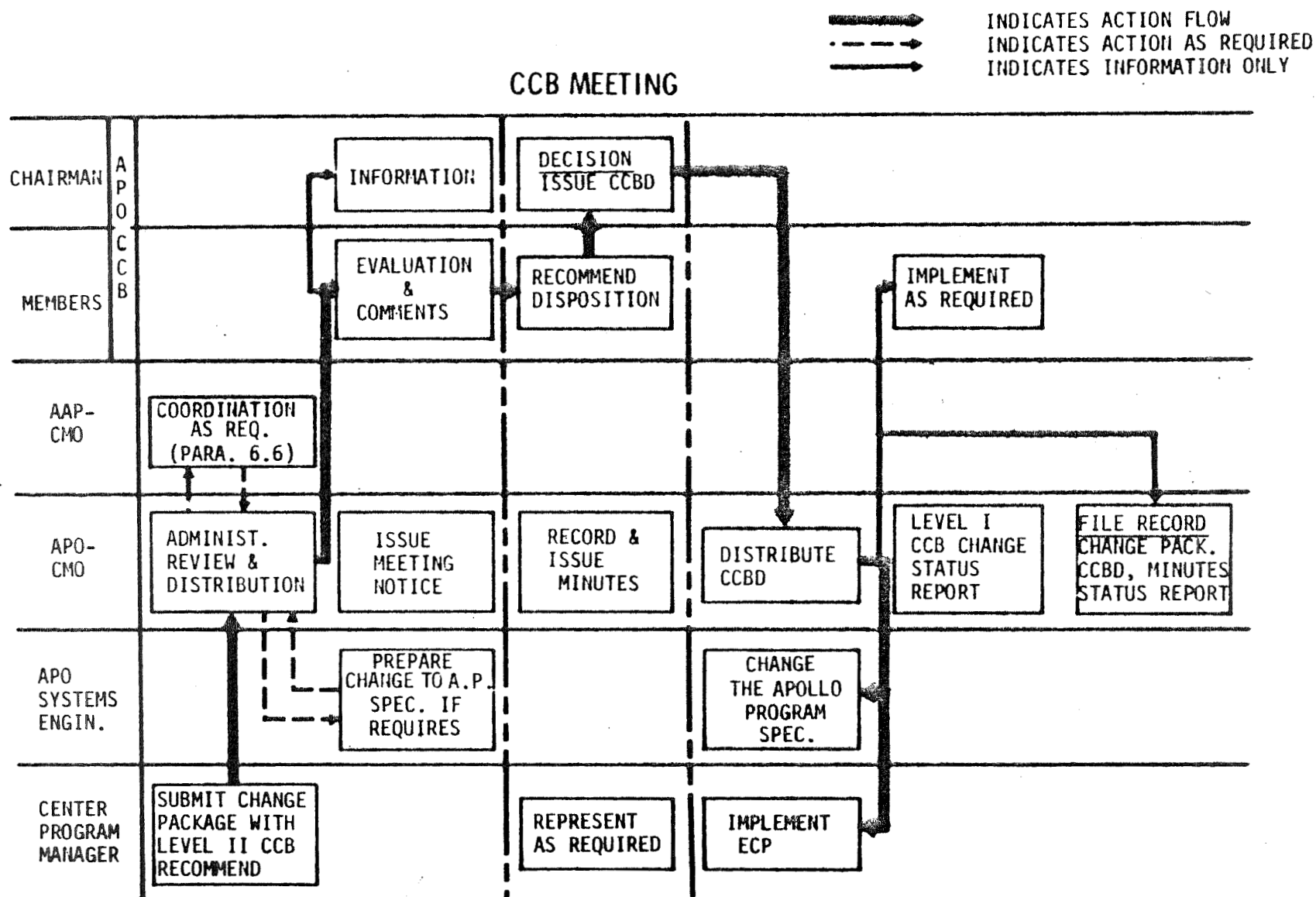
CONFIGURATION MANAGEMENT
OFFICE MANUAL

- 4.1.1 Processing of changes shall be on an expedited basis. Paper is hand-carried and coordination is accomplished on a telecon/verbal basis.

Distribution of CCBD copies is made directly at KSC with originals forwarded to the APO-CMO at Headquarters for distribution.

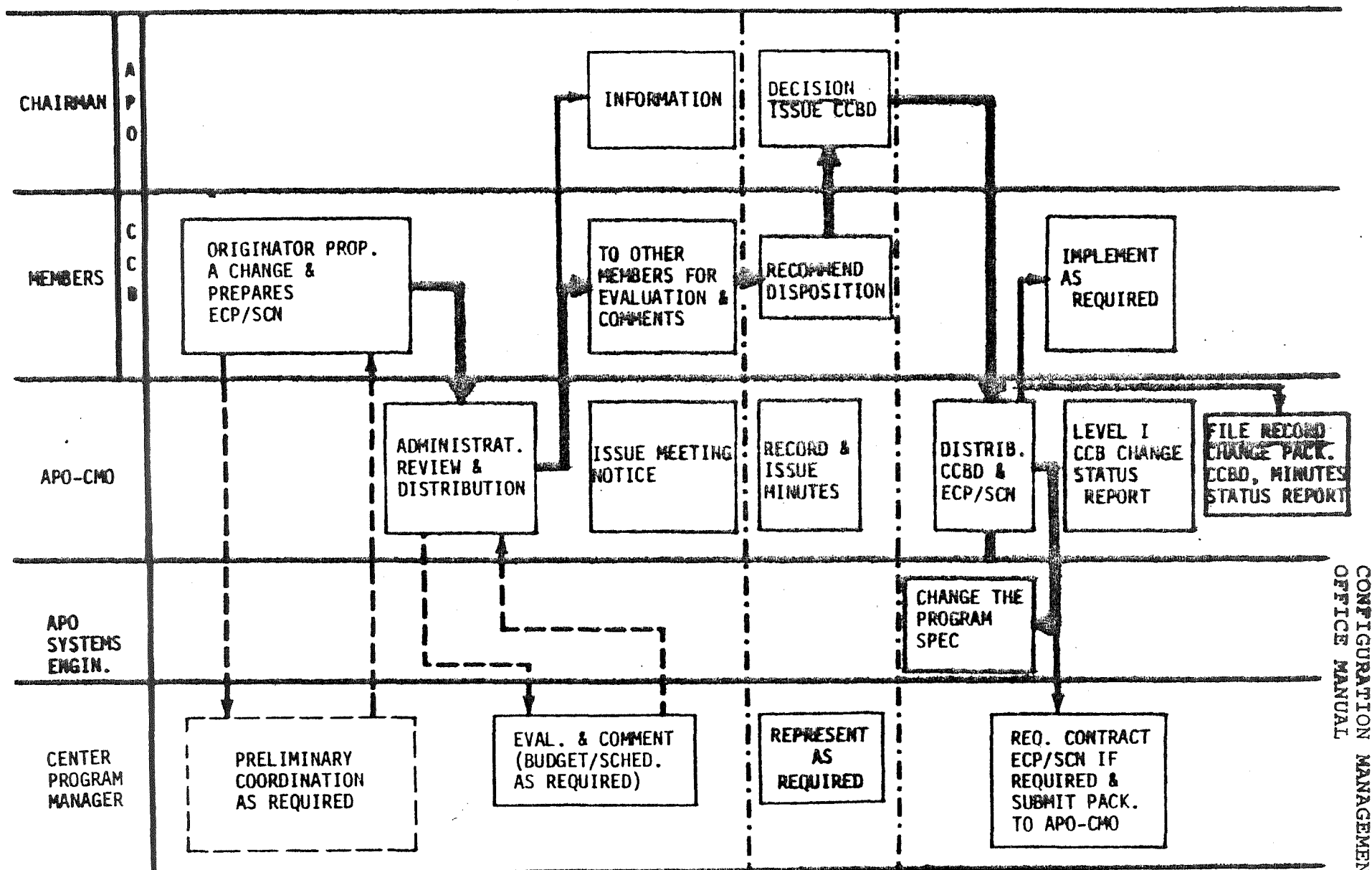
APO directorates shall be informed by telecon of pending changes, necessary paper datafaxed and impacts returned to the Mission Director at KSC in the same manner.

Records (Logs) of change activity shall be maintained and are transmitted to APO CMO on a periodic basis - Daily activity is reported by telecon.



PROCEDURES FOR CHANGES SUBMITTED BY THE CENTERS

(CHANGES OF HARDWARE, SOFTWARE & CONT. MILESTONES) CCB MEETING



CONFIGURATION MANAGEMENT
OFFICE MANUAL

1739

PROCEDURES FOR CHANGES ORIGINATED WITHIN APOLLO PROGRAM OFFICE
(CHANGES OF APOLLO PROGRAM SPEC. / CONT. MILESTONES)

Figure 4

(CHANGES OF HARDWARE, SOFTWARE & CONT. MILESTONES) CCB MEETING

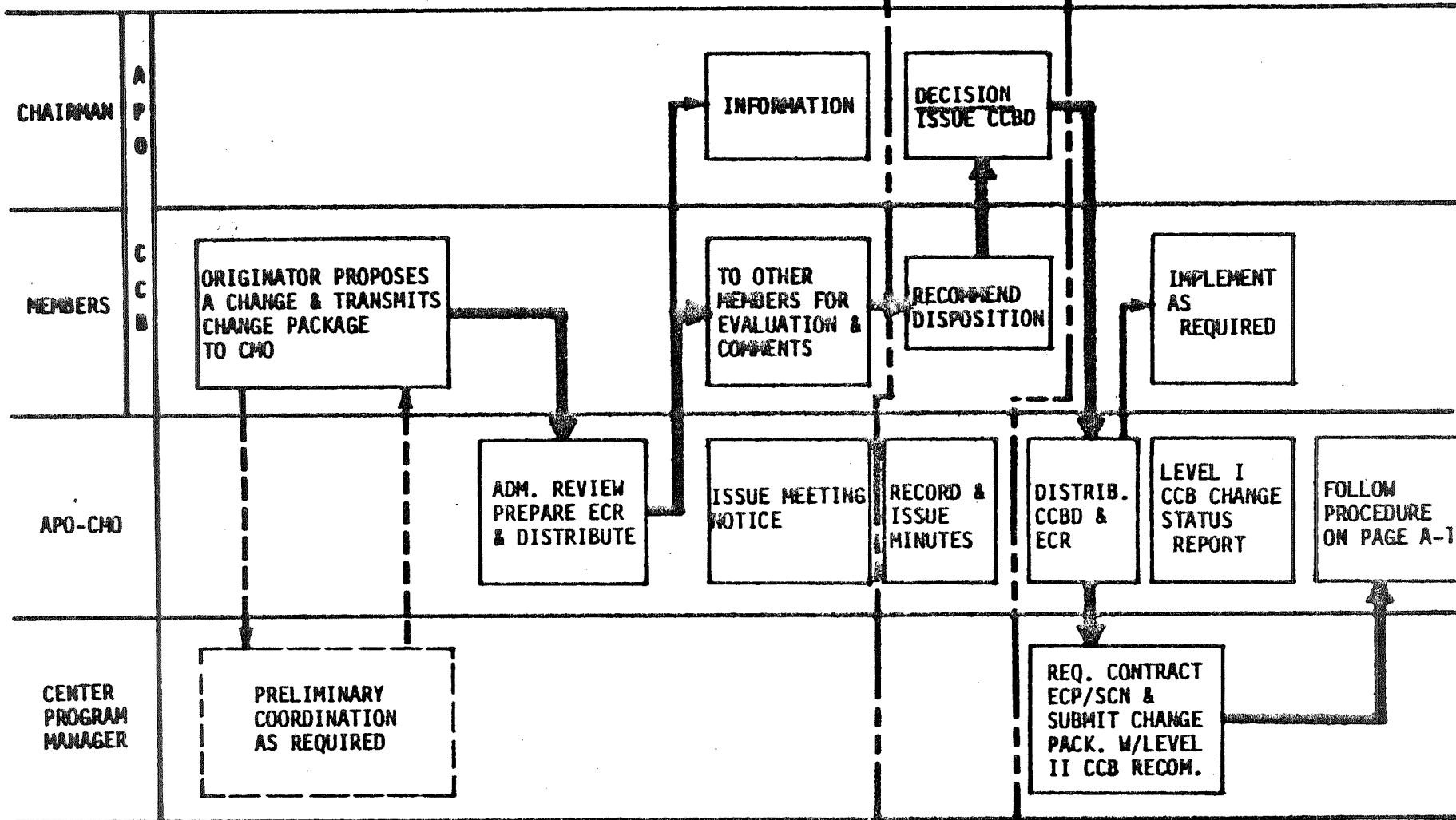


Figure 5